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UNITED STATES DEPARTMENT OF AGRICULTURE  
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Cooperating

**PUBLICATIONS LIST**  
on  
**TILLAGE AND TRACTION**  
**TILLAGE MACHINERY LABORATORY**



**Plant Industry Station**  
**Beltsville, Maryland**

February 1957

This list of publications represents the results of research at the Tillage Machinery Laboratory at Auburn, Ala. Such publications are an important contribution to the scientific literature of tillage and traction equipment and related phases of soil science. In many cases they report findings of research from which cooperating equipment-manufacturing companies have obtained data that helped them to serve the American farmer better.

Early publications in the list report the results of research by agricultural engineers of the Alabama Agricultural Experiment Station. Results of this research led to a cooperative project with the United States Department of Agriculture and this in turn influenced the establishment of the Laboratory in 1935.

# PUBLICATIONS LIST ON TILLAGE AND TRACTION

1. **Nichols, M. L.** *The Sliding of Metal Over Soil.* Agricultural Engineering, 6: 80-84, April 1925.
2. **Nichols, M. L., and J. W. Randolph.** *A Method of Studying Soil Stresses.* Agricultural Engineering, 6: 134-135, June 1925.
3. **Baver, L. D.** *The Relation of Exchangeable Cations to the Physical Properties of Soil.* Jour. Amer. Soc. Agron., 20: 921-941, 1928.
4. **Nichols, M. L.** *Methods of Research in Soil Dynamics as Applied to Implement Design.* Ala. Agr. Expt. Sta. Bull. 229, May 1929.
5. **Nichols, M. L. and L. D. Baver.** *An Interpretation of the Physical Properties of Soil Affecting Tillage and Implement Design by Means of Atterburg Consistency Constants.* Proc. of the Second Intern. Congress of Soil Science, Leningrad Section, pp. 175-188, 1930.
6. **Nichols, M. L.** *The Dynamic Properties of Soil.*  
I. *An Explanation of the Dynamic Properties of Soils by Means of Colloidal Films.* Agricultural Engineering, 12: 259-264, July 1931.
7. II. *Soil and Metal Friction.* Agricultural Engineering, 12: 321-324, Aug. 1931.
8. III. *Shear Values of Uncemented Soils.* Agricultural Engineering, 13: 201-204, Aug. 1932.
9. **Nichols, M. L., and T. H. Kummer.** *The Dynamic Properties of Soil.*  
IV. *A Method of Analysis of Plow Moldboard Design Based Upon Dynamic Properties of Soil.* Agricultural Engineering, 13: 279-285, Nov. 1932.
10. **Donner, Ralph D., and M. L. Nichols.** *The Dynamic Properties of Soil.*  
V. *Dynamics of Soil on Plow Moldboard Surfaces Related to Scouring.* Agricultural Engineering, 15: 9-13, Jan. 1934.
11. **Gray, R. B.** *A Farm Tillage Machinery Laboratory.* Agricultural Engineering, 15: 6, Jan. 1934.
12. **Reed, I. F.** *The Status of Research on Plowing Problems.* Agricultural Engineering, 15: 3-6, Jan. 1934.
13. **Nichols, M. L., and I. F. Reed.** *The Dynamic Properties of Soil.*  
VI. *Physical Reactions of Soils to Moldboard Surfaces.* Agricultural Engineering, 15: 187-190, June 1934.
14. **Randolph, J. W., and I. F. Reed.** *The Farm Tillage Machinery Laboratory.* Agricultural Engineering, 16: 219-220, June 1935.
15. **Donner, Ralph D.** *A Theory of Arch Action in Granular Media.* Agricultural Engineering, 17: 299-304, July 1936.
16. **Reed, I. F.** *Tests of Tillage Tools.*  
I. *Equipment and Procedures for Moldboard Plows.* Agricultural Engineering, 18: 111-115, March 1937.
17. **Randolph, J. W., and I. F. Reed.** *Tests of Tillage Tools.*  
II. *Effects of Several Factors on the Reactions of Fourteen-Inch Moldboard Plows.* Agricultural Engineering, 19: 29-33, Jan. 1938.
18. **Kummer, F. A., and M. L. Nichols.** *The Dynamic Properties of Soil.*  
VII. *A Study of the Nature of Physical Forces Governing the Adhesion Between Soil and Metal Surfaces.* Agricultural Engineering, 19: 73-78, Feb. 1938.
19. **Kummer, F. A.** *The Dynamic Properties of Soil.*  
VIII. *The Effect of Certain Experimental Plow Shapes and Materials on Scouring in Heavy Clay Soils.* Agricultural Engineering, 20: 111-114, March 1939.
20. **Randolph, J. W., I. F. Reed, and E. D. Gordon.** *Cotton Tillage Studies on Red Bay Sandy Loam.* U. S. Dept. Agr. Cir. 540, April 1940.
21. **Reed, I. F.** *Results of Legume Coverage Studies.* Agricultural Engineering, 21: 129-130, April 1940.
22. **Reed, I. F.** *A Method of Studying Soil Packing by Tractors.* Agricultural Engineering, 21: 281-282, 285, July 1940.
23. **Reed, I. F.** *Tests of Tillage Tools.*  
III. *Effect of Shape on the Draft of 14-Inch Moldboard Plow Bottoms.* Agricultural Engineering, 22: 101-104, March 1941.
24. **Gordon, E. D.** *Physical Reactions of Soil on Plow Disks.* Agricultural Engineering, 22: 205-208, June 1941.
25. **Merrill, R. M.** *How Farm Machinery Has Benefited Southern Agriculture.* Agricultural Engineering, 22: 247-248, July 1941.
26. **Reed, I. F.** *Farm Machinery Suitable for Southern Farms.* Agricultural Engineering, 23: 186-188, June 1942.
27. **Reed, I. F.** *Some Factors Affecting Design of Tillage Machinery and Proposed Approach to Their Evaluation.* Soil Sci. Soc. of Amer. Proc., 1944.
28. **Reed, I. F.** *Laying Out Fields for Tractor Plowing.* U.S. Dept. Agr. Farmers' Bull. 1045, Revised 1945.
29. **Kummer, F. A., and A. W. Cooper.** *The Dynamic Properties of Soil.*  
IX. *Soil Porosity Determinations with the Air Pressure Pycnometer as Compared with the Tension Method.* Agricultural Engineering, 26: 21-23, Jan. 1945.
30. **Reed, I. F.** *Plowing with Moldboard Plows.* U. S. Dept. Agr. Farmers' Bull. 1690, Revised May 1945.
31. **Jamison, V. C., and I. F. Reed.** *The Development and Application of the Method Used for the Reconstruction of the Drainage System of the Soil Bins at the Tillage Machinery Laboratory.* U. S. Dept. Agr., BPIS&AE Inf. Ser. 85, Feb. 1948.
32. **Jamison, V. C., I. F. Reed, and R. W. Pearson.** *The Use of Soil Tension Columns and a Modified Form of the Back Pressure Well in Studying Porosity and Drainage Properties of Tillage Testing Soils.* Soil Sci. Soc. of Amer. Proc., 13: 56-61, 1948.
33. **Reed, I. F.** *Disk Plows and Their Operation.* U. S. Dept. Agr. Farmers' Bull. 1992, May 1948.
34. **Reed, I. F., and M. O. Berry.** *Equipment and Procedures for Farm Tractor Tire Studies Under Controlled Conditions.* Agricultural Engineering, 30: 67-70, Feb. 1949.
35. **Jamison, V. C., and I. F. Reed.** *Durable Asbestos Tension Tables.* Soil Sci., Vol. 67, April 1949.
36. **Weaver, H. A.** *Tractor Use Effects on Volume Weight of Davidson Loam.* Agricultural Engineering, 31: 182-183, April 1950.
37. **Jomison, V. C., H. A. Weaver, and I. F. Reed.** *A Hammer-Driven Soil-Core Sampler.* Soil Sci., 69: 487-496, June 1950.



38. Reed, I. F., and J. W. Shields. *The Effect of Lug Height and of Rim Width on the Performance of Farm Tractor Tires*. Presented at SAE Natl. Tractor Meet., Sept. 1950. Excerpts published SAE Jour., pp. 40-41, Dec. 1950.
39. Reed, I. F., and E. D. Gordan. *Determining the Relative Wear Resistance of Metals*. Agricultural Engineering, 32: 98-100, Feb. 1951.
40. McKibben, E. G., and I. F. Reed. *The Effect of Rim Width on the Performance of Tractor Tires*. Presented at SAE Natl. Tractor Meet. Sept. 1951. Excerpts pub. SAE Jour., pp. 45-48, March 1952.
41. Jamison, V. C., H. A. Weaver, and I. F. Reed. *The Distribution of Tractor Tire Compaction Effects in Cecil Clay*. Soil Sci. Soc. of Amer. Proc. 15: 34-37, 1951.
42. Weaver, H. A., and V. C. Jamison. *Effects of Moisture on Tractor Tire Compaction of Soil*. Soil Sci., 71: 15-23, Jan. 1951.
43. Weaver, H. A., and V. C. Jamison. *Limitations in the Use of Electrical Resistance Soil Moisture Units*. Amer. Soc. Agron. Jour., 43: 602-605, 1951.
44. Jamison, V. C., I. F. Reed, C. M. Stakes, and T. E. Corley. *Effect of Tillage Depth on Soil Conditions and Cotton Plant Growth for Two Alabama Soils*. Soil Sci., 73: 203-210, March 1952.
45. Jamison V. C. *Heavy Machinery -- New Problem in Soil Management*. What's New in Crops and Soils 5: 11-12, 38, Oct. 1952.
46. Jamison, V. C. *Better Tillage Changes Soil Properties*. What's New in Crops and Soils, 6: 12, Oct. 1953.
47. Jamison, V. C., and H. A. Weaver. *Soil Hardness Measurements in Relation to Soil Moisture Content and Porosity*. Soil Sci. Soc. Amer. Proc., 16: 13-15, 1952.
48. McKibben, E. G., I. F. Reed, and C. A. Reaves. *Some Effects of Rim Width on Tractor Tire Performance*. Agricultural Engineering, 33: 487-490, 496, Aug. 1952.
49. McKibben, E. G., and I. F. Reed. *The Influence of Speed on the Performance Characteristics of Implements*. Presented before Natl. Tractor Meeting of SAE, Milwaukee, Wis., Sept. 1952.
50. McKibben, E. G., and M. O. Berry. *The Value of Replications in Research*. Agricultural Engineering, 33: 792, 798, Dec. 1952.
51. Reed, I. F., and M. O. Berry. *A Recording Torquemeter*. Agricultural Engineering, 34: 307-311, May 1953.
52. Reed, I. F., C. A. Reaves, and J. W. Shields. *Comparative Performance of Farm Tractor Tires Weighted With Liquid and Wheel Weights*. Agricultural Engineering, 34: 391-395, 399, June 1953.
53. Reed, I. F., and C. A. Reaves. *Performance of Relugged Tractor Tires*. Agricultural Engineering, 34: 532-533, 544, Aug. 1953.
54. Soil and Water Conservation Research Branch. *Some Physical and Chemical Properties of Soils Used in Implement Studies at the Tillage Machinery Laboratory*. Research Report 274, S&WCRB, ARS, Jan. 1954.
55. Reed, I. F., and W. F. McCreery. *Effects of Methods of Manufacture and Steel Specifications on the Service of Disks*. Agricultural Engineering, 35: 91-94, 97, Feb. 1954.
56. Reed, I. F. *Laying Out Fields for Tractor Plowing*. U. S. Dept. Agr. Farmers' Bull. 1045, Revised Oct. 1954.
57. Reed, I. F. *Plowing with Moldboard Plows*. U. S. Dept. Agr. Farmers' Bull. 1690, Revised Oct. 1954.
58. Nichols, M. L., A. W. Caaper, and C. A. Reaves. *Design and Use of Machinery to Loosen Compact Soil*. Soil Sci. Soc. of Amer. Proc., 19: 128-130, April 1955.
59. Nichols, M. L., and C. A. Reaves. *Soil Structure and Consistency in Tillage Implement Design*. Agricultural Engineering, 36: 517-520, 522, Aug. 1955.
60. Reed, I. F., and J. W. Shields. *11.00-20/12 NDCC Tire Tests*. Report File Tillage Machinery Laboratory, Agri. Engin. Res. Branch and Detroit Arsenal, May 1954.
61. Reed, I. F. *Some Effects of Oversizing Rear Tractor Tires*. Agricultural Engineering, 36: 602-604, Sept. 1955.
62. Shields, J. W., and I. F. Reed. *14.00-20/12 NDCC Tire Tests*. Mimeographed - Report File, Tillage Machinery Lab., Agri. Engin. Res. Branch, and Detroit Arsenal, Sept. 1955.
63. Reaves, C. A., and M. L. Nichols. *Surface Soil Reaction to Pressure*. Agricultural Engineering, 36: 813-816, 820, Dec. 1955.
64. Shields, J. W., and I. F. Reed. *9.00-20/8 NDCC Tire Tests*. Mimeographed - Report File, Tillage Machinery Lab., Agri. Engin. Res. Branch, and Detroit Arsenal, April 1956.
65. Shields, J. W., and I. F. Reed. *A Comparison of the Performance of a Single Tire with that of a Truck Equipped with Similar Tires*. Mimeographed - Report File, Tillage Mach. Lab., Agri. Engr. Res. Branch, and Detroit Arsenal, May 1956.
66. Gill, W. R., and C. A. Reaves. *Compaction Patterns of Smooth Rubber Tires*. Agricultural Engineering, 37: 677-680, 684, Oct. 1956.
67. Gill, W. R., and C. A. Reaves. *The Relationship of the of the Atterberg Consistency Limits and the Cation Exchange Capacity with Some Physical and Chemical Properties of Several Soils*. Presented at Soil Science Society Meeting, Cincinnati, Ohio, Nov. 1956. [To be published in Proceedings.]
68. McCreery, W. F., and M. L. Nichols. *The Geometry of Disks and Soil Relationships*. Agricultural Engineering, 37: 808-812, 820, Dec. 1956.
69. Raney, W. A., I. L. Savesan, and W. R. Gill. *Study of Soil Compaction on Mississippi River Delta Soils*. Sixieme Congres De La Science Du Sol - Paris 1956, pp. 521-524.
70. Caaper, A. W., G. E. Vandenberg, H. F. McCally, and A. E. Erickson. *A Strain Gage Pressure Cell for Measuring Pressures in Soil*. [Accepted for publication in Agricultural Engineering, 1957.]
71. Vandenberg, G. E., A. W. Caaper, A. E. Erickson, and W. M. Carleton. *Soil Pressure Distribution Under Tractor and Implement Traffic in An Artificial Field*. [Submitted in 1956 for publication in Agricultural Engineering.]
72. Caaper, A. W., and M. L. Nichols. *Observations of Soil Compaction Tests*. Presented at Winter meeting of ASAE, 1956. [Submitted in 1956 for publication in Agricultural Engineering.]





